reduced. The second Melbourne general catalogue, containing the meridian results from 1871 to 1884 inclusive, thus incorporating the whole of the results obtained with the old transit-circle up to the date of its disuse, is in process of formation. An alteration has been made in the photo-heliograph, so as to secure a picture of 8 inches diameter instead of 4 inches, as formerly. There have been several interruptions to the continuity of the sun-photographs during the year, owing to derangement of the instrument and dome, and only 130 pictures were obtained up to June 11, when the instrument was dismantled for repairs. The sixth volume of the results of astronomical observations for the years 1876 to 1880 inclusive, was published in February 1885, and has been distributed. The first part of the observations with the great Melbourne telescope (NATURE, vol. xxxiii. p. 538), from its erection in 1869 to the present date, has also been published during the year to which this Report refers.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 JUNE 20-26

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on June 20

Sun rises, 3h. 44m.; souths, 12h. 1m. 14·5s.; sets, 20h. 18m.; decl. on meridian, 23° 27′ N.: Sidereal Time at Sunset, 14h. 14m.

Moon (four days after Full) rises, 22h. 7m.*; souths, 2h. 49m.; sets, 7h. 36m.; decl. on meridian, 15° 34′ S.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian ° ′
Mercury ...	4 17	12 45	21 13	24 57 N.
Venus	1 50	9 14	16 38	15 14 N.
Mars	11 28	17 45	0 2*	2 41 N.
Jupiter... ...	11 40	17 56	0 12*	2 19 N.
Saturn... ...	4 40	12 50	21 0	22 37 N.

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich)

June	Star	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image ° °
21 ...	B.A.C. 7487 ...	6½ ...	0 36 ...	1 55 ...	89 258
24 ...	24 Piscium ...	6½ ...	0 43 ...	1 47 ...	87 241

June 21 ... Sun at greatest declination north; longest day in northern latitudes.

Variable Stars

Star	R.A. h. m.	Decl. ° ′		h. m.	
U Cephei	0 52·2 ...	81 16 N. ...	June 24,	1 14	*m*
R Virginis	12 32·7 ...	7 37 N. ...	,, 25,		*m*
W Virginis	13 20·2 ...	2 47 S. ...	,, 26,	2 20	*M*
δ Libræ	14 54·9 ...	8 4 S. ...	,, 26,	23 32	*m*
U Coronæ	15 13·6 ...	32 4 N. ...	,, 20,	20 41	*m*
U Ophiuchi... ...	17 10·8 ...	1 20 N. ...	,, 21,	2 14	*m*
		and at intervals of	20	8	
X Sagittarii... ...	17 40·4 ...	27 47 S. ..	June 26,	2 0	*M*
U Sagittarii... ..	18 25·2 ...	19 12 S. ...	,, 22,	3 0	*M*
β Lyræ...	18 45·9 ...	33 14 N. ...	,, 26,	21 30	*M*
η Aquilæ	19 46·7 ...	0 43 N. ...	,, 23,	22 0	*m*
T Delphini	20 40·1 ...	15 59 N. ...	,, 23,		*M*
δ Cephei	22 24·9 ...	57 50 N. ...	,, 22,	2 30	*m*
R Pegasi	23 0·9 ...	9 56 N. ...	,, 25,		*M*

M signifies maximum; *m* minimum.

GEOGRAPHICAL NOTES

THE paper on the aborigines of Formosa, by Mr. G. Taylor, in the *China Review*, to which we have already adverted, is continued in the last number (vol. xiv. No. 4), and as it progresses it contains more and more information, especially with regard to the number of different tribes and their various customs, which is wholly new, either in European publications or in those of the Far East. The number last noticed concluded with the Paiwans, the tribe with which the Dutch came in contact in the seventeenth century, during their temporary occupation of part of Formosa, and of which therefore we had the most information. The present instalment deals with several other tribes, including one very peculiar and hitherto unknown people, the Caviangans, who are comparatively few in number, inhabiting lofty mountains, and having many superstitions with regard to hills and the spirits which inhabit them. We have also an account of the Tipuns, the most powerful tribe in southern Formosa, inhabiting the great plain inland from the headland marked Double Peak on the charts of the east coast. These have a tradition that they came from some other country hundreds of years ago, but they appear now to differ little from their neighbours the Paiwans. But there is one very radical distinction, viz., that when a man marries he enters his wife's family, whereas amongst the Paiwans the reverse is the case. Amongst them tattooing is a mark of rank, and is strictly prohibited to the commonalty. Another tribe described is the Amias. The Chinese class these as aborigines, but the true aboriginal tribes look on them as foreigners. They have a curious tradition of their origin, but the aborigines have the more prosaic one of shipwreck, and it appears that the Amias do not consider themselves entitled to equal social rank with the other savages. In appearance and customs they differ much from their neighbours, and worship one Supreme Being, not a multitude of spirits. They believe in an after state, dependent on personal conduct in this life, and they have a sort of purgatory amongst their beliefs. They have a vague notion of lands and peoples where communication is carried on by means of other than oral speech. This, says Mr. Taylor, is the only trace in South Formosa of any original idea of writing. Their explanations of certain natural phenomena, such as thunder and lightning, sunset and sunrise, are curious. Earthquakes they believe to be caused by a pig scratching itself against an iron bar stuck into the earth. This paper leaves on the mind, even more strongly than its predecessor, the impression that in the future Formosa will offer ethnological problems as interesting and complicated as any equal area on the earth's surface. It is clear, too, that all the divisions of the inhabitants of the island hitherto given by writers, whether Chinese or Europeans, are wholly incorrect and unscientific. There are wider differences amongst the tribes, and a far greater number of different tribes, than has ever been supposed. Moreover, it is obvious that in the present state of our knowledge of the tribes, it would be idle to theorise about them. Mr. Taylor, dealing only with a very small section in the south of the island, has described six or seven tribes; amongst these we find some calling themselves aborigines, and looking down as strangers and new-comers on others who have been generally supposed to be aborigines. In view of the wild and inaccessible nature of a large part of the eastern half of Formosa, and of the danger of entering it on account of the chronic state of war which exists between the natives and their Chinese masters, it must be a long time before a clear or trustworthy ethnological account of Formosa can be written. It is quite possible that some of the largest ethnological problems of the Far East may be involved in Formosa; the knot may, perhaps, lie there. Meantime, Mr. Taylor deserves thanks for his careful and interesting collection of new facts which are vital to the discussion of Formosan ethnology.

A REPORT addressed by Col. Fontana, the Governor of Chubut, to the President of the Argentine Republic, gives details of the exploration of Chubut up to the Andes lately made by the Governor. The Expedition, consisting of thirty men, left Raiwon, the chief town of Chubut territory, on October 14, and returned on February 8, having traversed about 1000 leagues in four months. It first followed the tortuous course of the Rio Chubut to its source in the Cordilleras, about the 42nd degree south latitude, the northern limit of Chubut, and then, crossing well-watered and fertile prairies and enormous forests, reached the 46th parallel. It discovered three passages into Chili, and laid down accurately the courses of several rivers heretofore fixed by guess-work. Col. Fontana believes he was the first to quench his thirst in the spring from which the River Senger takes its rise: he has removed the doubts which existed respecting Lakes Colne and Musters, and verified their positions; and he has determined the geographical position of the spots at which the Senger and Chico debouch into the lake. He promises in a short time to have completed maps which will correct many errors concerning the hydrography and orography of this region.

We have received the annual report for 1885 of the Russian Geographical Society, which contains short accounts of the expeditions of M. Prjevalsky to Central Asia, M. Potanin to China, M. Grum-Grzimailo in the sub-Pamir region, MM. Wolter and Trusman; and the usual notices on works for which the medals of the Society were awarded. Geographers surely will be sorry not to find in this report any notice of the work done by the Caucasian and Siberian branches of the Society, which usually so greatly increases the value of the annual report of the Russian Geographical Society.

We are glad to learn from the last Annual Report of the Russian Geographical Society that the Appendix to the *Russian Gazetteer*, by P. P. Semenoff, is in course of preparation. The full edition of the observations at the Polar Stations on Novaya Zemlya and on the Lena; the remarkable collection of maps dealing with the delta of the Amu-daria, Baron Kaulbars; and a geological map of the shores of Lake Baikal, are also in preparation.

At the last meeting of the Paris Geographical Society, Dr. Maurel read a paper on his travels in Cochin China and Cambodia, on a mission from the Minister of Public Instruction. By means of a series of maps representing the Indo-Chinese peninsula in the seventh, eleventh, eighteenth, and nineteenth centuries, he showed the relative importance at different epochs of each of the peoples inhabiting this region. He then gave a general account of the country, its geography, climate, population, &c. A large collection of ethnographical objects which he had with him added much interest to that part of his paper. The young Cambodians at present being educated in Paris were present, clothed in the national costume.

THE DETERMINATION OF THE INDEX OF REFRACTION OF A FLUID BY MEANS OF THE MICROSCOPE

Of the various means adopted hitherto for the determination of the refractive index of a fluid, the most usually adopted has been that of the hollow prism, telescope, and collimator.

This method involves (α) the determination of the angle of the prism; (β) the position of minimum deviation; (γ) the use of monochromatic light, if errors arising from the different dispersive qualities of the substances are to be avoided. These preliminaries render the labour of determining the index a very difficult task, and the observer will scarcely expect to accomplish more than one observation at a sitting.

Cleaning the prism is not the least of the troubles, and when we add to them the fact that many liquids are so opaque that sufficient light can scarcely be passed through them for the observation, it is not surprising that so few have been found to possess the courage necessary for attacking the problem. The writer having had occasion for frequent determination of the index of refraction, has found the use of the microscope far surpasses the usual method in giving results of the greatest delicacy combined with a minimum of cost and of time.

Starting with the well-known fact, that an object viewed through a medium whose refractive index is different from that of air will occupy a different position from its image, or in the language of the text-books, $v = u + \frac{t}{\mu}$, where v determines the position of the geometrical focus of a pencil after direct refraction through a plate whose thickness is t, the writer was led to adopt the following plan.

On an ordinary "slip" as used for mounting preparations for the microscope a delicate mark is made with a writing diamond. A large but very thin "cover-glass" is cut in half, and its pieces cemented to the "slip" on either side of the mark, leaving a space of about one-eighth of an inch; then, resting on these supports, and bridging over the intervening space, is placed a small but very thin "cover-glass," and a drop of the fluid to be examined is run under this.

The fine mark made on the "slip" is now viewed through this with the microscope, using as high a power as possible, for the higher the objective the more delicate will be its focal adjustment; when the object is in focus the position of the "fine adjustment" must be read off. The microscope must then be left, and the slip removed for the examination of any other fluid. The top cover-glass is lifted off, the slip cleaned, the *same* cover-glass replaced, and a drop of a different fluid run under. Replacing now the slip upon the stage, and looking for the mark which was previously in focus, it will be found that an alteration of the fine adjustment is necessary to bring it into focus.

If the medium is of lower refractive index, the objective will have to be lowered, and conversely. Thus a rapid comparison of the relative refractive indexes of two media may easily be made.

But not only can the relative refractive powers of different bodies be thus obtained; the absolute numerical values may with the greatest accuracy be determined. For this it is essential that the fine adjustment screw should have accurate micrometer divisions, and this is usually the case now that immersion objectives are in common use. Two fluids must be selected whose refractive indexes present a wide difference, say oil of cassia and water; focus the mark, first viewed through water, secondly viewed through oil of cassia, and read off the number of divisions the screw has been turned through in the alteration of the focus. The refractive indexes of oil of cassia and water being known from the tables, a numerical value will by the formula be obtained for each division of the screw-head, and thus the absolute numerical index of any medium easily be determined.

By this simple and inexpensive method the writer has obtained from fifteen to twenty absolute indexes in a sitting of an hour's duration.

The importance of obtaining suitable media of high refractive index for mounting objects to be viewed with very high powers cannot be overestimated, for not only is a wider cone of light thus brought to bear upon the object, but its image is advanced, so that a greater working distance is obtained between the front lens of the objective and the cover-glass.

Gordon Thompson

St. Charles's College, Notting Hill

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

Cambridge.—The twentieth annual report of the Museums and Lecture-Rooms Syndicate, lately issued, recounts continuous progress in many scientific departments. The number of students attending demonstrations in the Cavendish Laboratory reached 100 last winter, and during the year twelve persons have done original work in the Laboratory.

The Plumian Professor (Mr. G. H. Darwin) introduced a new feature last summer by giving a course of lectures in the Long Vacation, and the attendance (thirteen) was encouraging. Few students attend the Plumian Professor's advanced lectures on the orbits and perturbations of planets.

In mechanism Prof. Stuart reports that the temporary museum and lecture-room has become very insufficient.

In chemistry there has been a considerable increase of students in advanced classes and special departments. The new laboratory is now being vigorously advanced. The classes in mineralogy maintain an average of sixteen students. The acquisition of 250 specimens from Mr. Field's collection has added some minerals previously unrepresented, and has improved the collection considerably for students' use.

In geology Prof. Hughes regrets the disadvantages of his present accommodation for teaching and lecturing, and finds the specimens of value are lost to the Museum because of its inadequate means of displaying them. A valuable collection of Cretaceous Cambridge fossils, many of them type-specimens, has been presented by Mr. James Carter of Cambridge.

Mr. Marr, Fellow of St. John's College, is engaged upon the arrangemext of the Foreign and British Cambrian fossils, of which it will be desirable soon to publish a new catalogue. The petrological series has been rearranged, and also the collection of microscope slides. The Upper Jurassic fossils have been largely added to and rearranged. Many interesting additions to the museum are chronicled in the report. It shows how largely the Museum gains from the interest of present and former students at Cambridge.

Prof. Babington has been chiefly occupied with the study of different parts of the Herbarium—especially the magnificent collection of European Rubi—and the identification of plants sent by botanists from a distance. Dr. Vines's students have numbered nearly sixty, and the Botanical Laboratory is inconveniently crowded. The commencement of a botanical museum has been made by Messrs. Potter and Gardiner, with the object